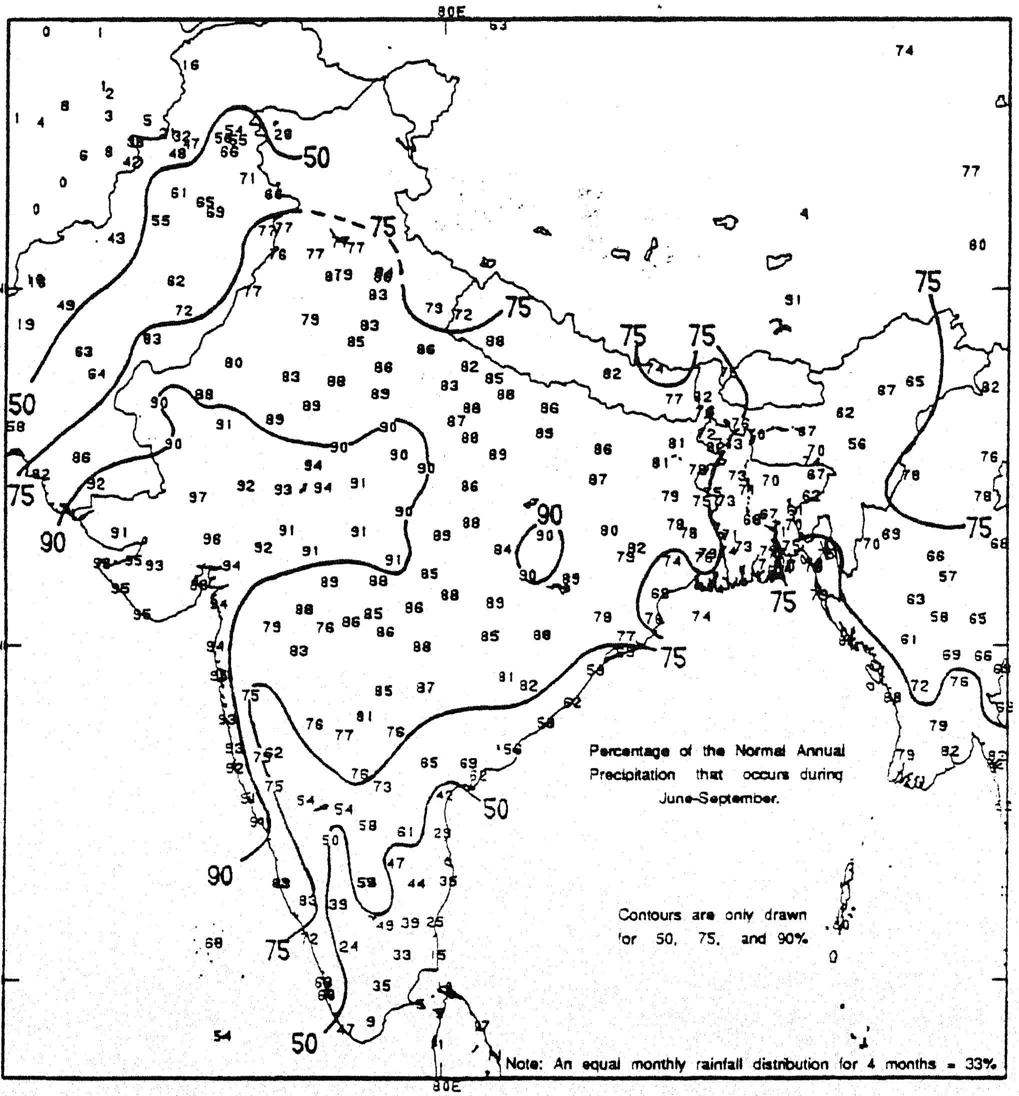
CLIMATE ANALYSIS CENTER

WEEKLY CLIMATE BULLETIN

No. 89/28 **Washington, DC** **July 15, 1989**



THE MONTHS OF JUNE THROUGH SEPTEMBER NORMALLY DELINEATE THE MONSOON SEASON IN MOST OF INDIA AND EASTERN PAKISTAN. MANY LOCATIONS IN CENTRAL AND WESTERN INDIA USUALLY RECEIVE BETWEEN 75% AND 95% OF THEIR ANNUAL PRECIPITATION DURING THESE FOUR MONTHS. FOR ADDITIONAL INFORMATION ON THE INDIAN MONSOON AND THE AFRICAN SAHEL RAINY SEASON, REFER TO THE SPECIAL CLIMATE SUMMARIES COMMENCING ON PAGE 9.

UNITED STATES DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL WEATHER SERVICE - NATIONAL METEOROLOGICAL CENTER

WEEKLY CLIMATE BULLETIN

This Bulletin is issued weekly by the Climate Analysis Center and is designed to indicate, in a brief concise format, current surface climatic conditions in the United States and around the world. The Bulletin contains:

- Highlights of major climatic events and anomalies.
- U.S. climatic conditions for the previous week.
- U.S. apparent temperatures (summer) or wind chill (winter).
- U.S. cooling degree days (summer) or heating degree days (winter).
- Global two–week temperature anomalies.
- Global four–week precipitation anomalies.
- Global monthly temperature and precipitation anomalies.
- Global three–month precipitation anomalies (once a month).
- Global twelve–month precipitation anomalies (every three months).
- Global three–month temperature anomalies for winter and summer seasons.
- Special climate summaries, explanations, etc. (as appropriate).

Most analyses contained in this Bulletin are based on preliminary, unchecked data received at the Climate Analysis Center via the Global Telecommunications System. Similar analyses based on final, checked data are likely to differ to some extent from those presented here.

STAFF

Editor	David Miskus
Associate Editor	Paul Sabol
Contributors	Michael C. Falciani
	Keith W. Johnson
	Jeffery D. Logan
	Vernon L. Patterson
	Richard J. Tinker
Graphics	Robert H. Churchill

*To receive copies of the **Bulletin** or to change mailing address, write to:*

Climate Analysis Center, W/NMC53

Attn: WEEKLY CLIMATE BULLETIN

NOAA, National Weather Service

Washington, DC 20233

For CHANGE OF ADDRESS, please include a copy of your old mailing label.

Phone: (301) 763–8071

WEEKLY CLIMATE BULLETIN REQUEST

☐ Please ADD my address to your mailing list.

☐ Please CHANGE my address on your mailing list.

☐ Please DROP my address from your mailing list.

Name ____________________

Organization ____________________

Address ____________________

City ____________________ State __________ Zip __________

GLOBAL CLIMATE HIGHLIGHTS

MAJOR CLIMATIC EVENTS AND ANOMALIES AS OF JULY 15, 1989

1. Central and Western United States:

HEAT WAVE EASES.

Temperatures averaged less than 3°C above normal as hot weather diminished; however, the warm, dry weather aggravated current and potential forest fire conditions across much of the West (see U.S. Weekly Climate Highlights) [3 weeks].

2. North Central United States:

RAINS OCCUR, BUT LONG-TERM DRYNESS REMAINS.

As much as 105 mm of rain occurred at some stations but others received little or no precipitation as long-term deficits persisted (see U.S. Weekly Climate Highlights) [17 weeks].

3. Northeastern United States:

RAINS DIMINISH.

Scattered showers, with total rainfall approaching 62 mm, were reported at a few locations. Most other stations measured little or no precipitation (see U.S. Weekly Climate Highlights) [10 weeks].

4. Gulf Coast:

SCATTERED SHOWERS OCCUR.

Nearly 135 mm of rain fell at some stations; however, many stations recorded less than 24 mm of rain (see U.S. Weekly Climate Highlights) [9 weeks].

5. Central South America:

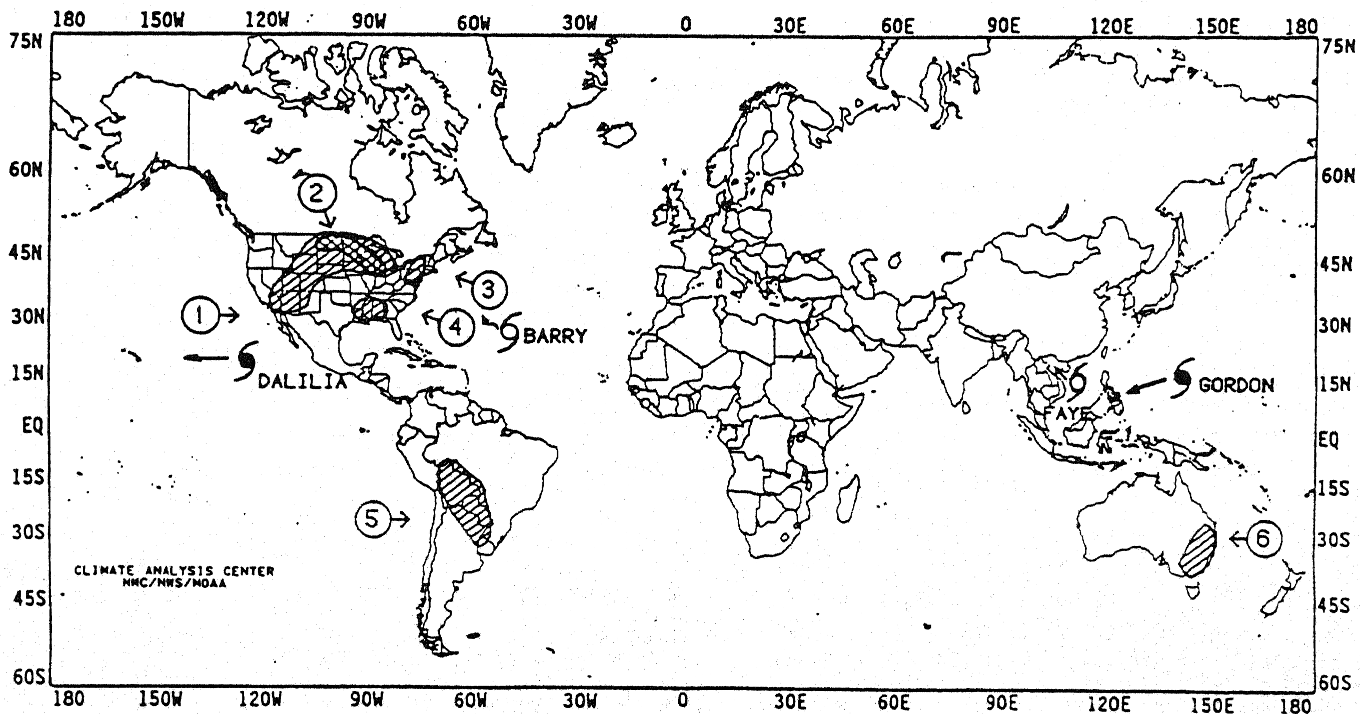
VERY COLD.

Abnormally cold weather, with temperatures as much as 7°C below normal, spread across Bolivia, Paraguay, northern Argentina, western Uruguay, and west central Brazil[2 weeks].

6. Southeastern Australia:

"BIG WET" ENDS.

Although isolated stations reported up to 92 mm of precipitation, most stations had little or no rain [Ended at 16 weeks].



EXPLANATION

TEXT: Approximate duration of anomalies is in brackets. Precipitation amounts and temperature departures are this week's values.

MAP: Approximate locations of major anomalies and episodic events are shown. See other maps in this bulletin for current two week temperature anomalies, four week precipitation anomalies, long-term anomalies, and other details.

UNITED STATES WEEKLY CLIMATE HIGHLIGHTS

FOR THE WEEK OF JULY 9 THROUGH JULY 15, 1989.

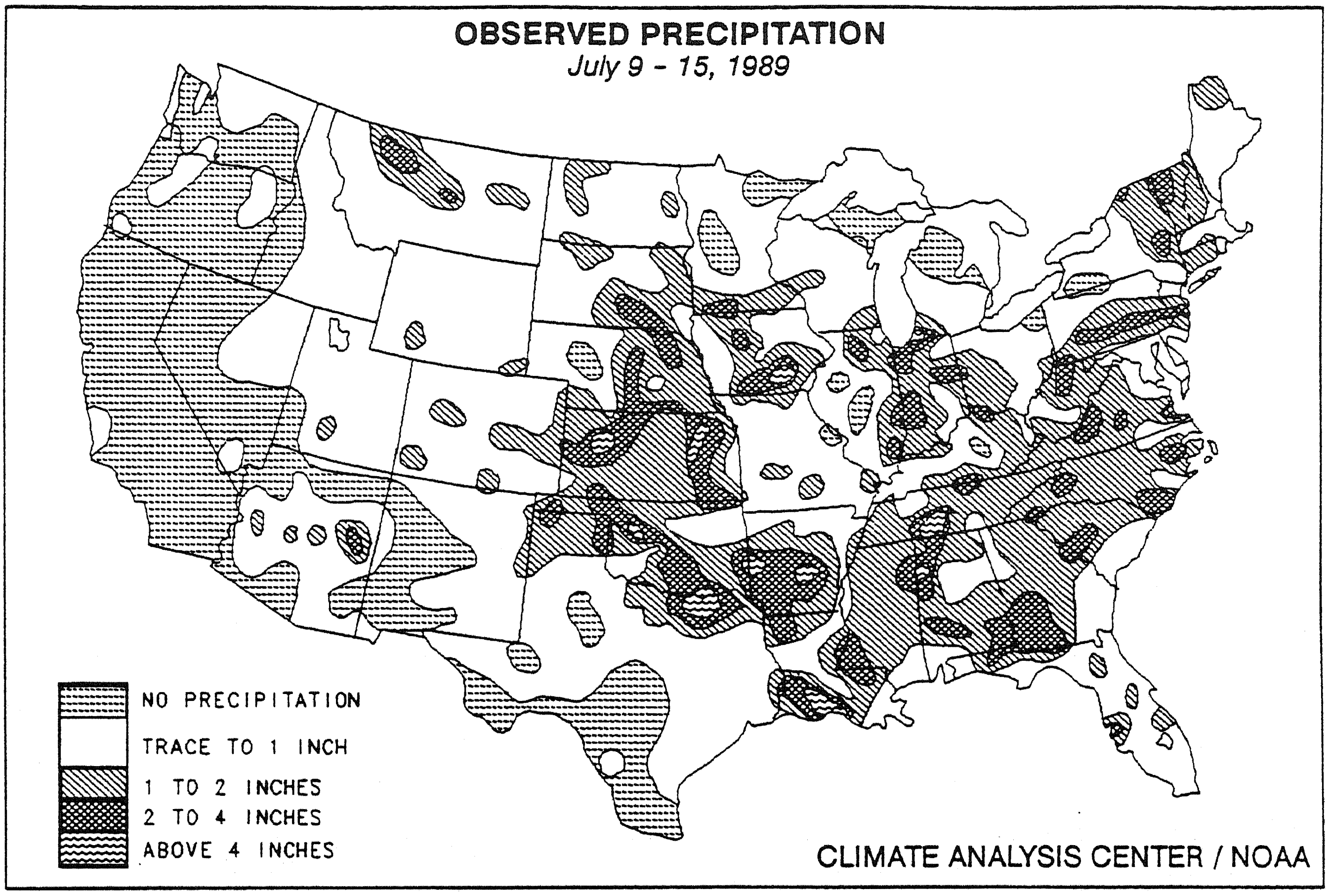
Typical mid-summer conditions, with scattered showers and thunderstorms and occasional hot and humid weather, prevailed across most of the nation east of the Rockies. In contrast, slightly cooler than normal and seasonably dry weather covered most of the Far West. Early in the week, a ridge of high pressure entrenched over the central Plains sent readings into the one hundreds from the southern and central Great Plains eastward into the central Corn Belt. Farther north, strong thunderstorms developed ahead of a warm front in the western Great Lakes and northern Ohio Valley as locally heavy rains produced flooding in central Wisconsin, southwestern Michigan, and northern Indiana. On Monday, the warm front and a trailing cold front advanced eastward towards the Northeast, triggering severe weather, including torrential downpours, damaging winds, large hail, and 10 tornadoes, in Massachusetts, New York, and New Jersey. In the nation's midsection, an upper-level disturbance generated numerous thunderstorms across Kansas and Nebraska. By mid-week, a cold front stalled from the western Corn Belt eastward to the mid-Atlantic. A series of low pressure centers developed and moved along the front, producing severe weather in the Midwest. The combination of high humidity and temperatures in the southern Atlantic Coast states created dangerous apparent temperatures in excess of 110°F. Unsettled weather continued into the latter half of the week as an upper-air disturbance over the south-central Great Plains and a stationary front across the Southeast triggered abundant showers and thunderstorms throughout the central and southern U.S. Up to 7.5 inches of rain fell within 7 hours on Friday in south-central Louisiana. Cooler and drier air from Canada invaded the northeastern quarter of the country while extreme heat continued in the Southwest.

According to the River Forecast Centers, the greatest weekly totals were located in the central and south-central Great Plains, along the central Gulf Coast, in the Tennessee Valley, and the mid-Atlantic (see Table 1). Between 4 and 8 inches of rain were reported in eastern Kansas, central Oklahoma, northeastern Texas, southern Louisiana, and central Mississippi, Tennessee, and Virginia. Elsewhere, moderate to heavy amounts were observed in parts of the northern Rockies, western Corn Belt, western New England, and throughout most of the Southeast. Light to moderate precipitation fell on the northern half of the Rockies, the northern three-quarters of the Great Plains, and across most of the eastern half of the nation. Little or no rain occurred in much of the Far West, the southern thirds of the Rockies and Great Plains, from the upper Peninsula of Michigan southeastward to western Pennsylvania, and in eastern Kentucky. In Alaska, moderate to heavy rains were observed in the southern, western, and northern portions of the state while the eastern islands of Hawaii received heavy showers.

Early in the week, unseasonably hot weather prevailed across the southwestern, central, and eastern U.S. as temperatures climbed into the nineties and one hundreds. Cooler conditions towards the latter half of the week in the eastern two-thirds of the nation brought weekly temperature averages closer to normal. As a result, the greatest positive departures in the contiguous U.S. were generally between +3°F and +4°F in parts of the Great Plains, Midwest, northern Rockies, and along the southern Atlantic Coast (see Table 2). Farther north, unusually mild conditions were experienced throughout much of Alaska as temperatures averaged up to 9°F above normal. Subnormal weekly temperatures were recorded along the central Pacific Coast, in the upper Missouri Valley, the south-central Great Plains, and from the western Great Lakes eastward to the New England and mid-Atlantic coasts (see Table 3). Lows dipped into the thirties and forties towards the end of the week in the upper Midwest as Marquette, MI fell to 32°F on July 15.

TABLE 1. Selected stations with 2.00 or more inches of precipitation for the week.

STATION	TOTAL (INCHES)	STATION	TOTAL (INCHES)
LAFAYETTE, LA	5.29	HARRISBURG, PA	2.57
OTTUMWA, IA	4.12	ILIAMNA, AK	2.53
SOUTH BEND, IN	4.07	MASSENA, NY	2.42
PINE BLUFF, AR	4.03	WRIGHTSTOWN/MCGUIRE AFB, NJ	2.41
HICKORY, NC	4.01	GREAT FALLS, MT	2.38
MCCOMB, MS	3.78	SHREVEPORT/BARKSDALE AFB, LA	2.36
MERIDIAN, MS	3.51	MORGANTOWN, WV	2.32
HILO/LYMAN, HAWAII, HI	3.43	NORFOLK, VA	2.32
VALDOSTA/MOODY AFB, GA	3.43	JOPLIN, MO	2.25
TUSCALOOSA, AL	3.20	LITTLE ROCK AFB, AR	2.25
COLUMBIA, SC	3.10	COLUMBUS AFB, MS	2.24
AUGUSTA, GA	3.06	HUNTSVILLE, AL	2.15
WILMINGTON, NC	3.02	NORFOLK, NE	2.10
TOPEKA, KS	2.99	BURLINGTON, VT	2.00
ALBANY, GA	2.96		


OBSERVED PRECIPITATION
July 9 - 15, 1989
NO PRECIPITATION
TRACE TO 1 INCH
1 TO 2 INCHES
2 TO 4 INCHES
ABOVE 4 INCHES
CLIMATE ANALYSIS CENTER / NOAA

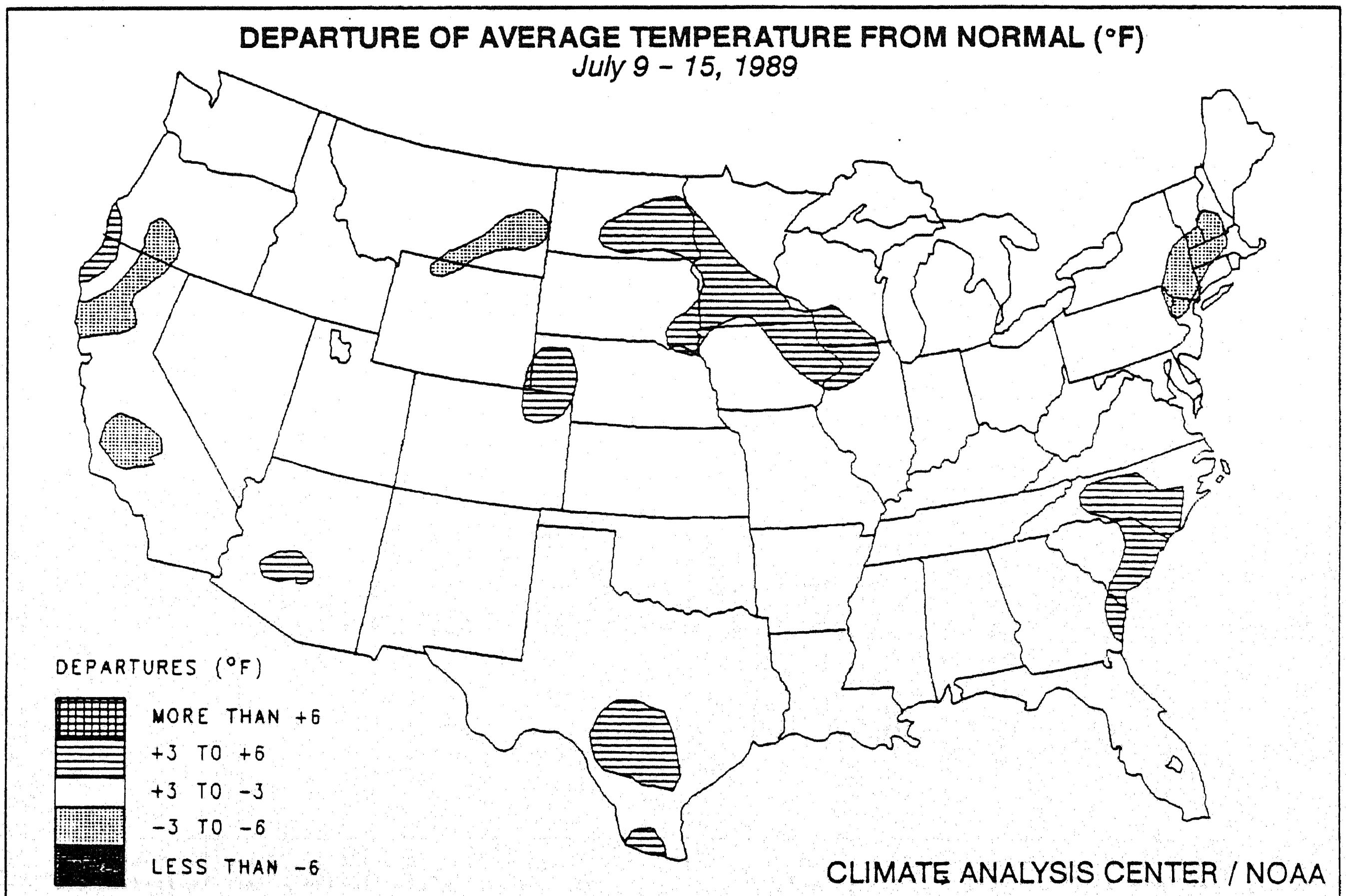
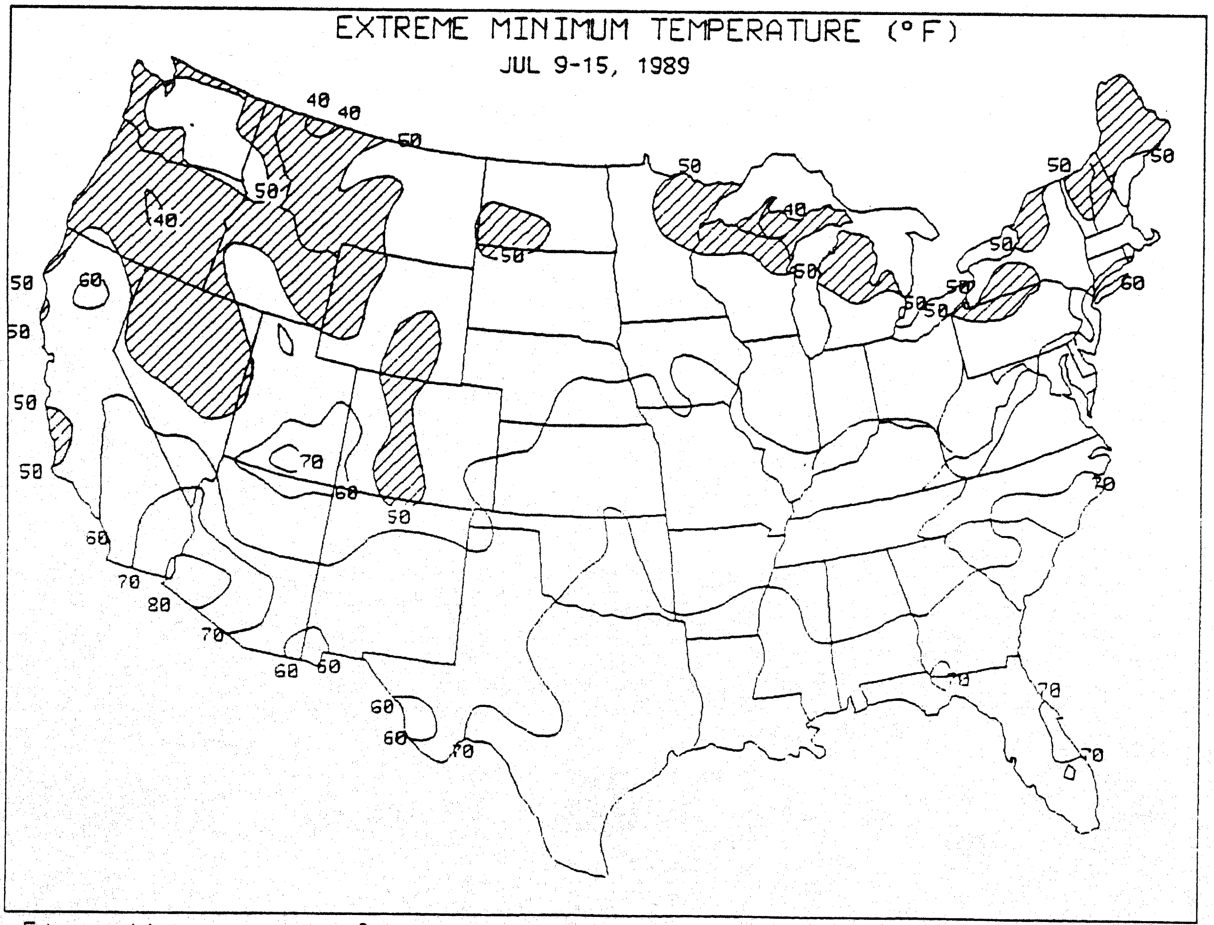

DEPARTURE OF AVERAGE TEMPERATURE FROM NORMAL (°F)
July 9 - 15, 1989
DEPARTURES (°F)
MORE THAN +6
+3 TO +6
+3 TO -3
-3 TO -6
LESS THAN -6
CLIMATE ANALYSIS CENTER / NOAA

TABLE 2. Selected stations with temperatures averaging 3.5°F or more ABOVE normal for the week.

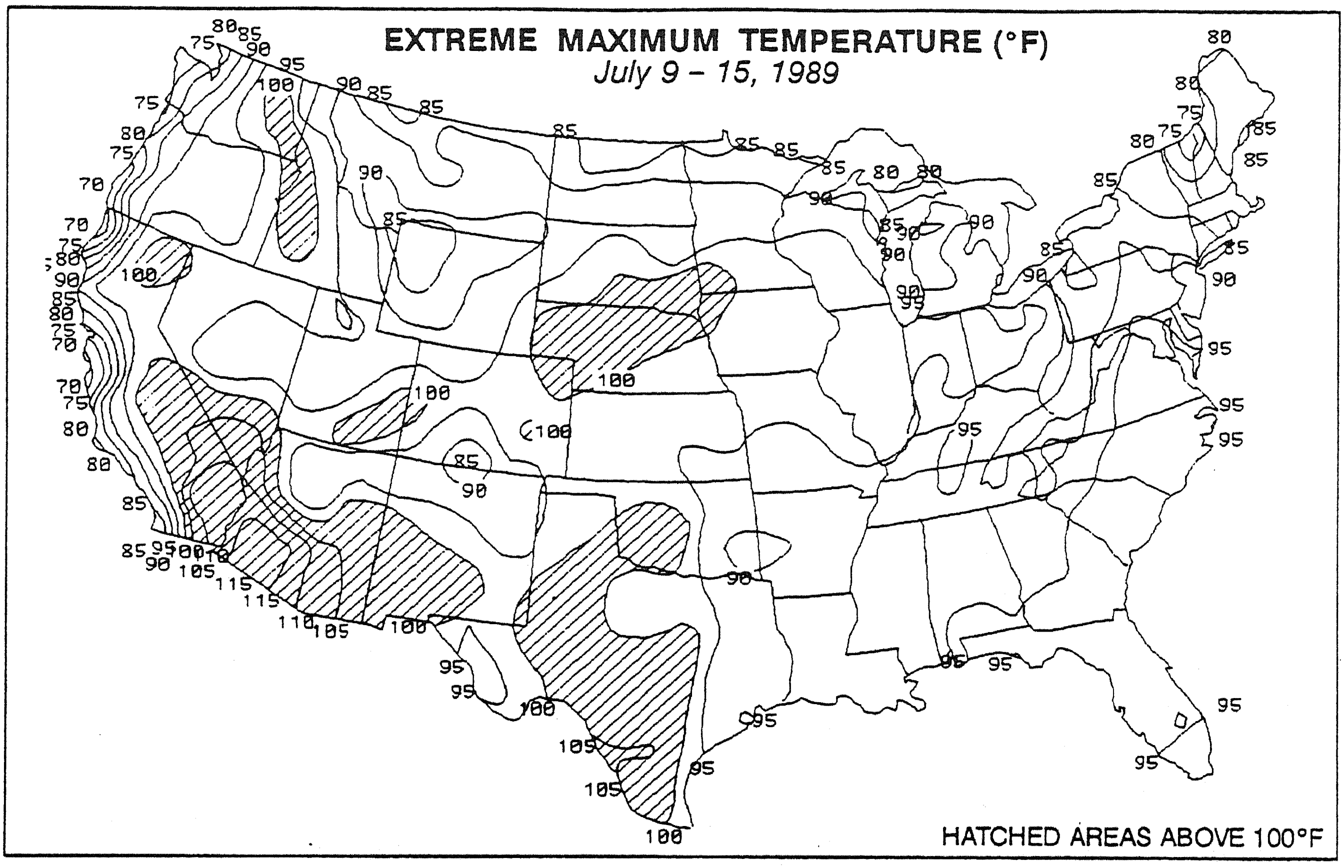
STATION	DEPARTURE (°F)	AVERAGE (°F)	STATION	DEPARTURE (°F)	AVERAGE (°F)
JUNEAU, AK	+9.4	65.2	BISMARCK, ND	+4.2	74.6
BARROW, AK	+8.9	47.9	HOMER, AK	+4.2	57.0
FAIRBANKS, AK	+7.4	69.4	SAN ANTONIO, TX	+4.1	88.6
NORTHWAY, AK	+7.3	66.1	VICTORVILLE/GEORGE AFB, CA	+4.1	82.6
GULKANA, AK	+5.9	63.5	PHOENIX, AZ	+3.7	96.1
WATERLOO, IA	+5.8	78.7	MCALLEN, TX	+3.7	87.9
BIG DELTA, AK	+5.3	65.7	CHARLESTON, SC	+3.7	84.2
CORDOVA/MILE 13, AK	+4.8	58.9	BURLINGTON, IA	+3.7	79.2
TALKEETNA, AK	+4.7	62.9	JAMESTOWN, ND	+3.7	73.6
VALDEZ, AK	+4.4	57.9	SAVANNAH, GA	+3.6	84.6
ROCKFORD, IL	+4.3	77.3	CEDAR RAPIDS, IA	+3.6	78.0
BEEVILLE NAS, TX	+4.2	88.0	SITKA, AK	+3.6	57.9
CHARLOTTE, NC	+4.2	82.8	EUREKA, CA	+3.5	59.5

TABLE 3. Selected stations with temperatures averaging 2.5°F or more BELOW normal for the week.

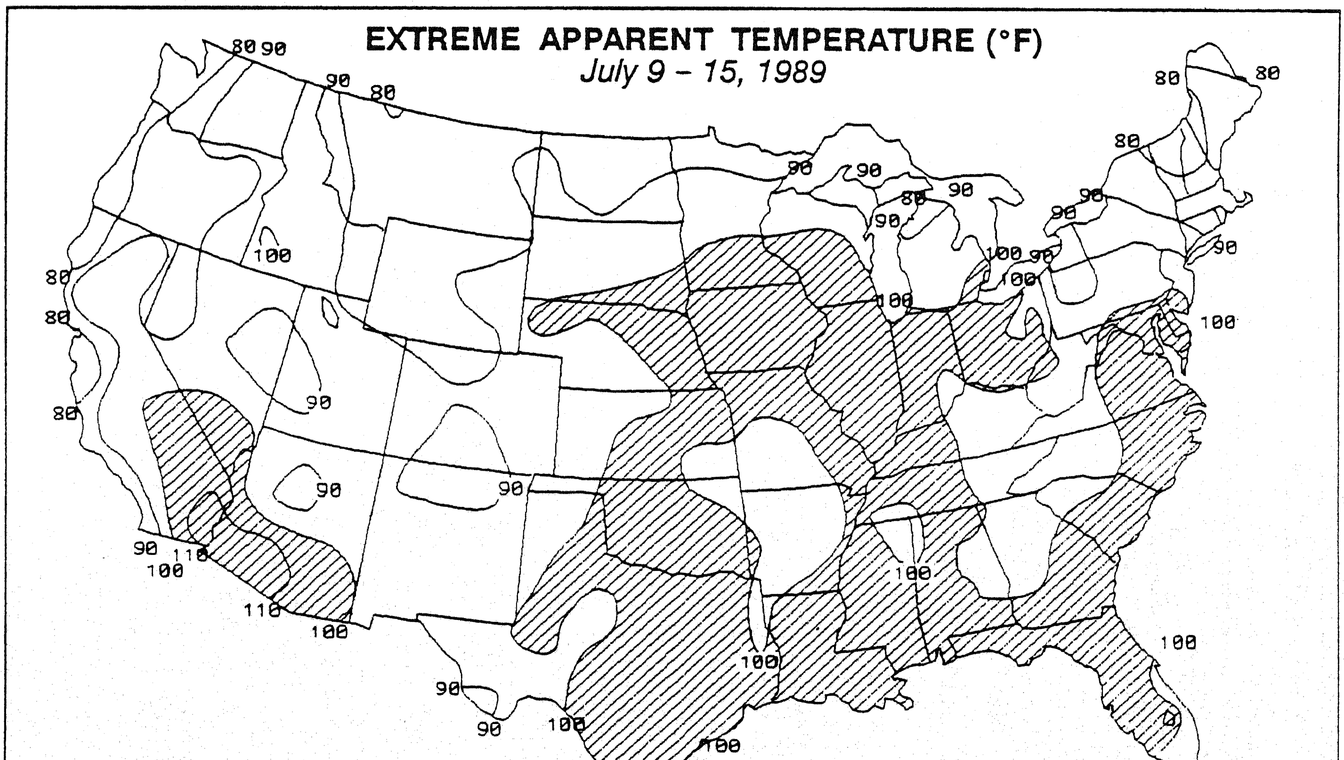
STATION	DEPARTURE (°F)	AVERAGE (°F)	STATION	DEPARTURE (°F)	AVERAGE (°F)
PASO ROBLES, CA	-4.7	69.4	WORCESTER, MA	-3.2	66.8
MILES CITY, MT	-4.3	70.1	CUT BANK, MT	-3.0	60.9
REDDING, CA	-3.8	79.7	CONCORD, NH	-2.8	66.6
MARQUETTE, MI	-3.7	60.9	ROME/GRIFFISS AFB, NY	-2.7	66.9
BAKERSFIELD, CA	-3.6	80.8	ALBANY, NY	-2.7	68.8
WILKES-BARRE, PA	-3.4	68.4	LEBANON, NH	-2.6	65.8
POUGHKEEPSIE, NY	-3.4	68.9	MASSENA, NY	-2.6	66.5
UTICA, NY	-3.3	66.5	MEDFORD, OR	-2.5	69.8
BURNS, OR	-3.2	66.0	HARTFORD, CT	-2.5	70.9

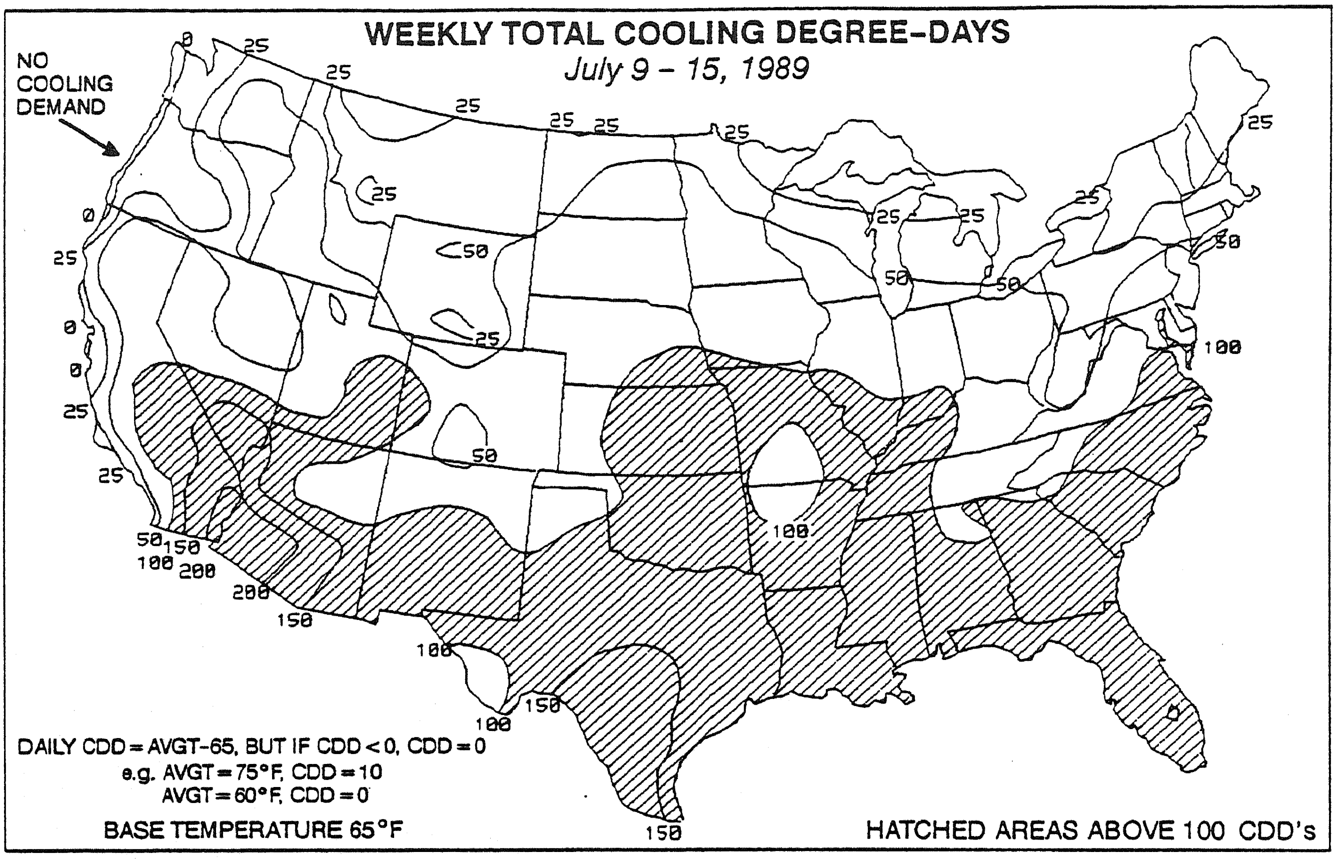


Extreme minimum temperatures (°F) during the week of July 9-15, 1989. Isotherms are drawn for every 10°F, and shaded areas are less than 50°F. After a hot start to the week, cool Canadian air invaded the northeastern quarter of the nation and dropped lows into the thirties and forties across the upper Midwest and New England. Unseasonably cool conditions persisted during most of the week in the northwestern quarter of the U.S.

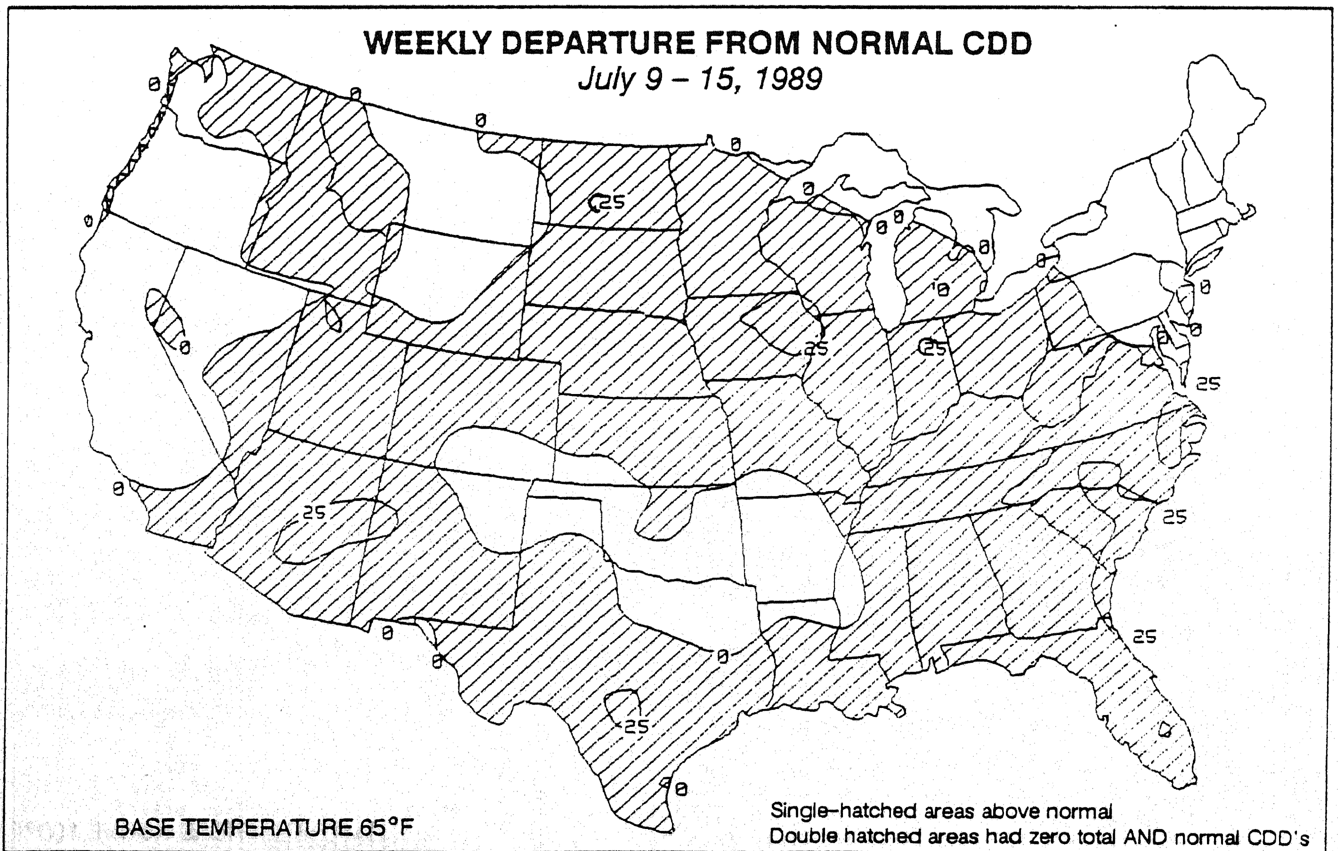


Triple digit readings baked much of the Southwest, northern Rockies, central and the southern Great Plains and some stations surpassed 110°F (top). Dangerous apparent temperatures (greater than 105°F) were found along the Gulf and southern Atlantic Coasts, in the Southeast, Midwest, Great Plains, and Southwest (bottom).



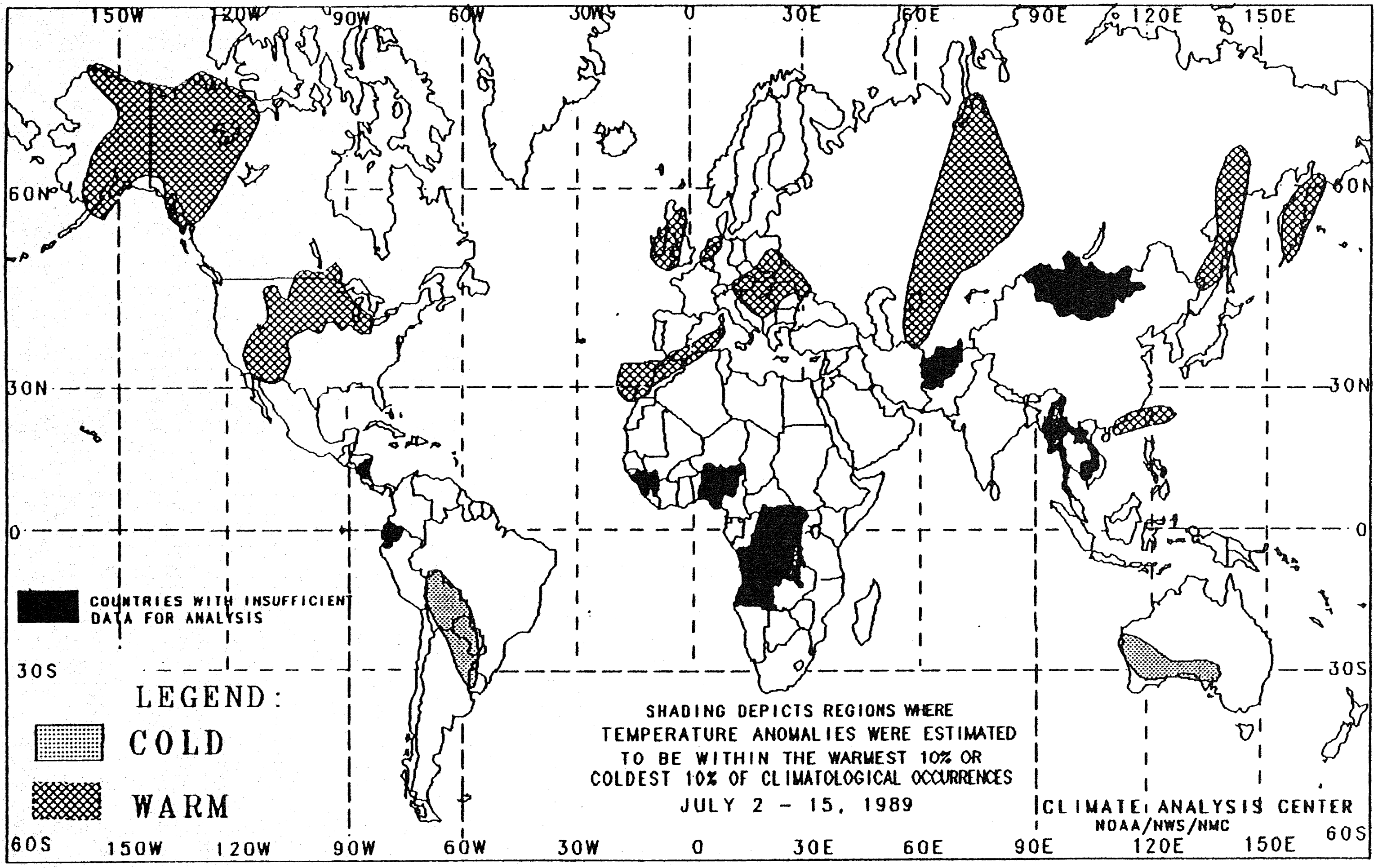


Weekly total CDD values exceeded 100 throughout most of the southern half of the country as the desert Southwest and southern Texas recorded CDD's above 150 (top). Most of the nation experienced above normal cooling demand except for the Northeast, Pacific Coast, northern Rockies, and south-central Great Plains. (bottom).



GLOBAL TEMPERATURE ANOMALIES

2 *WEEKS*



The anomalies on this chart are based on approximately 2500 observing stations for which at least 13 days of temperature observations were received from synoptic reports. Many stations do not operate on a twenty-four hour basis so many night time observations are not taken. As a result of these missing observations the estimated minimum temperature may have a warm bias. This in turn may have resulted in an overestimation of the extent of some warm anomalies.

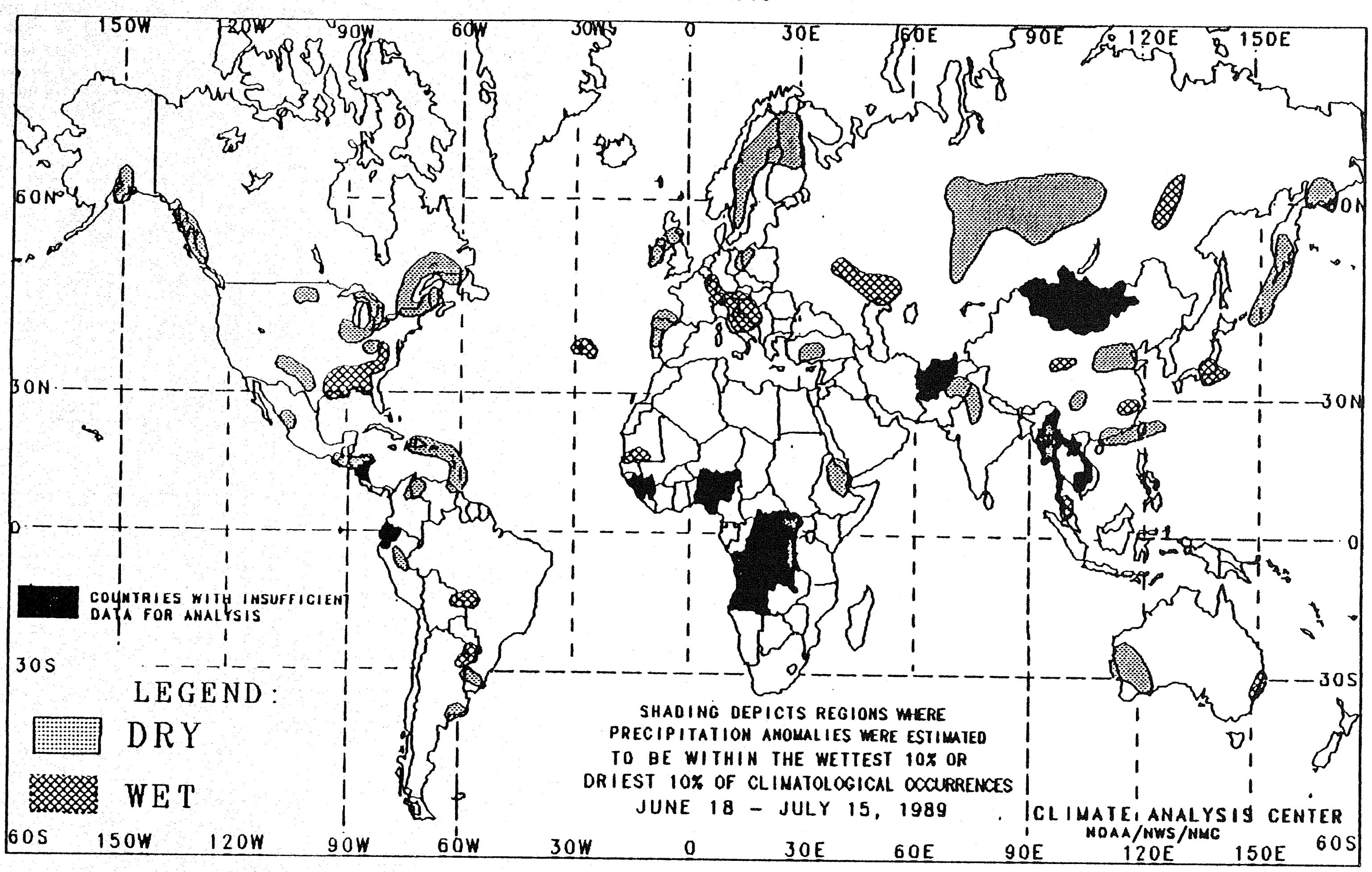
Temperature anomalies are not depicted unless the magnitude of temperature departures from normal exceeds 1.5°C.

In some regions, insufficient data exist to determine the magnitude of anomalies. These regions are located in parts of tropical Africa, southwestern Asia, interior equatorial South America, and along the Arctic Coast. Either current data are too sparse or incomplete for analysis, or historical data are insufficient for determining percentiles, or both. No attempt has been made to estimate the magnitude of anomalies in such regions.

This chart shows general areas of two week temperature anomalies. Caution must be used in relating it to local conditions, especially in mountainous regions.

GLOBAL PRECIPITATION ANOMALIES

4 WEEKS



The anomalies on this chart are based on approximately 2500 observing stations for which at least 27 days of precipitation observations (including zero amounts) were received or estimated from synoptic reports. As a result of both missing observations and the use of estimates from synoptic reports (which are conservative), a dry bias in the total precipitation amount may exist for some stations used in this analysis. This in turn may have resulted in an overestimation of the extent of some dry anomalies.

In climatologically arid regions where normal precipitation for the four week period is less than 20 mm, dry anomalies are not depicted. Additionally, wet anomalies for such arid regions are not depicted unless the total four week precipitation exceeds 50 mm.

In some regions, insufficient data exist to determine the magnitude of anomalies. These regions are located in parts of tropical Africa, southwestern Asia, interior equatorial South America, and along the Arctic Coast. Either current data are too sparse or incomplete for analysis, or historical data are insufficient for determining percentiles, or both. No attempt has been made to estimate the magnitude of anomalies in such regions.

The chart shows general areas of four week precipitation anomalies. Caution must be used in relating it to local conditions, especially in mountainous regions.

SPECIAL CLIMATE SUMMARY

CLIMATE ANALYSIS CENTER, NMC
NATIONAL WEATHER SERVICE, NOAA

REVIEW OF THE 1989 INDIAN MONSOON SEASON

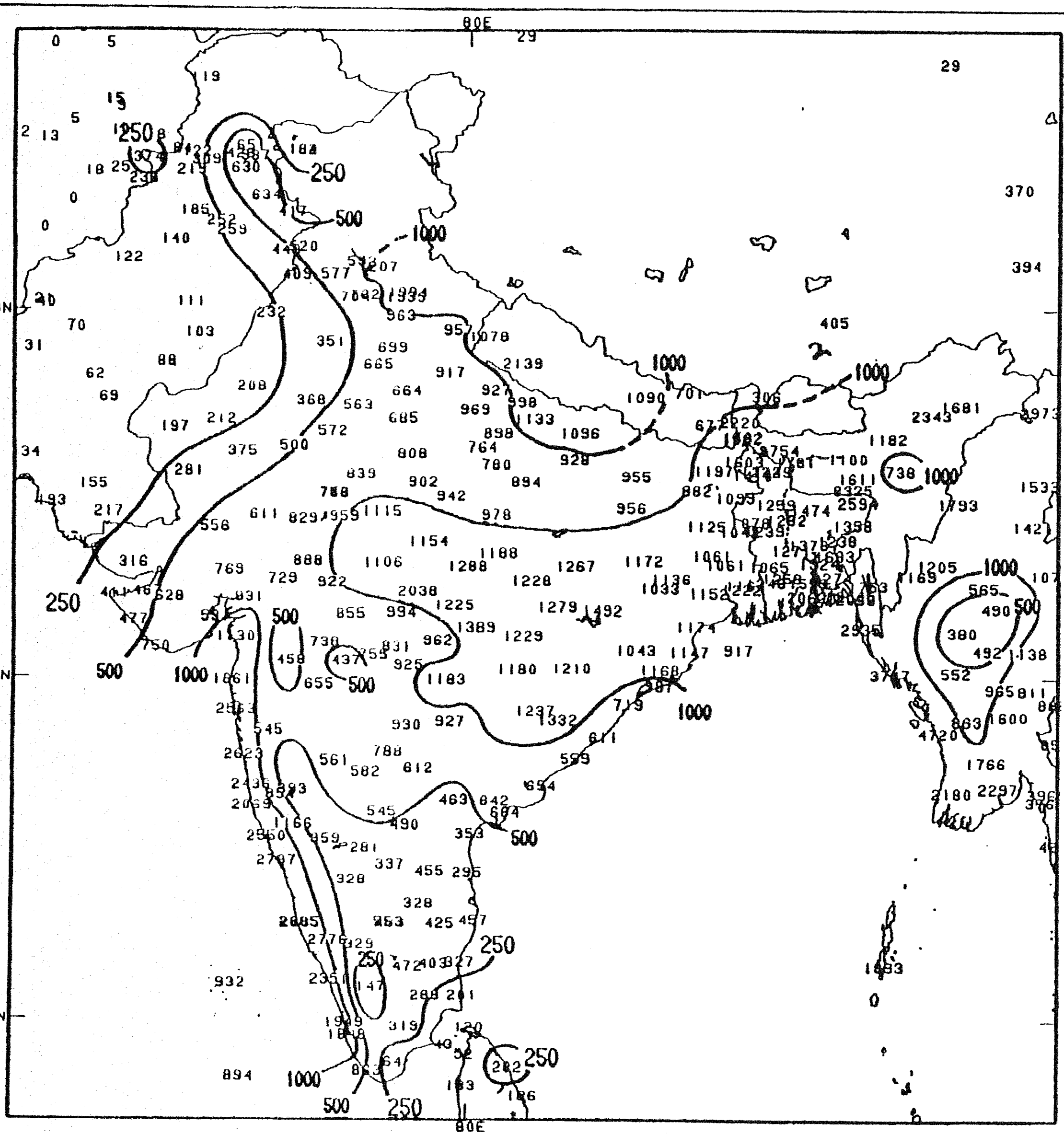
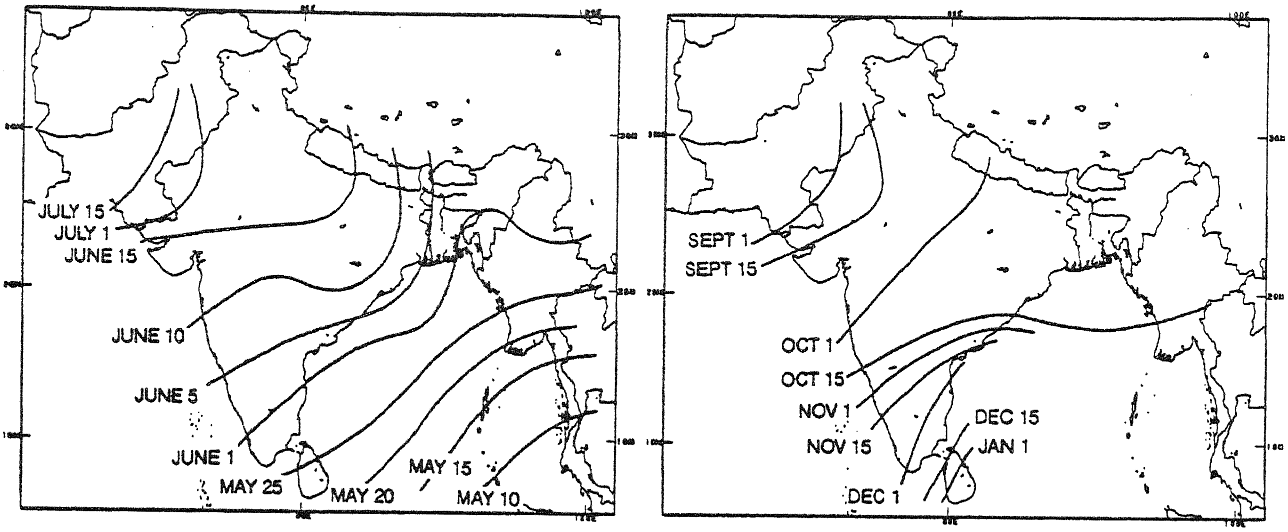


Figure 1. Total normal precipitation (mm) during June-September. Isohyets are only drawn for 250, 500, and 1000 mm. During the monsoon season, Indian rainfall totals usually increase from west to east and from south to north except for the western coast as the four-month amounts can surpass 2500 mm.

In southern Asia, the months of June, July, August, and September are normally the wettest time of the year in response to the southwest monsoon circulation. The monsoon, generated by differential heating between ocean and land masses, usually provides most of Bangladesh, India, and eastern Pakistan with 75% to 95% of the annual precipitation during these four months (see front cover). June through September normal rainfall amounts generally increase from west to east except along India's western coast, where the four-month totals can exceed 2500 mm (see Figure 1). During May, the monsoon circulation usually advances northwestward from the Bay of Bengal and reaches extreme southern and eastern India and southeastern Bangladesh by June 1 (see Figure 2). By mid-July, the monsoon normally extends across the entire Indian continent and into central Pakistan. Around September 1, the monsoon usually begins its southeastward withdrawal from Pakistan and reaches extreme southern India by the end of October.

Last year, most of southern Asia recorded near to above normal monsoonal rains, including Pakistan and northwestern India, where the 1987 monsoon season never became fully established and the region suffered severe drought. Unfortunately, the copious rainfall in India's Assam state and Nepal caused severe downstream flooding throughout Bangladesh. Heavy rains also caused some flooding in both India's and Pakistan's Punjab state (refer to the Weekly Climate Bulletin #88/40 dated October 1, 1988, pages 9–10).

This year, most stations in eastern and southern India have generally measured near to above normal precipitation since June 1 (see Figure 3), and the corresponding totals are depicted in Figure 4. Partial data, satellite images, and press reports have also indicated near to above normal rainfall in Bangladesh. In contrast, parts of northwestern India and extreme eastern Pakistan have observed subnormal precipitation, suggesting either a delay in the arrival of the monsoon or relatively weak southwesterly circulation in that region.



MEAN DATE FOR ARRIVAL

MEAN DATE FOR RETREAT

Figure 2. Mean dates of the southwest monsoon's arrival and retreat obtained from the Joint Agriculture and Weather Facility.

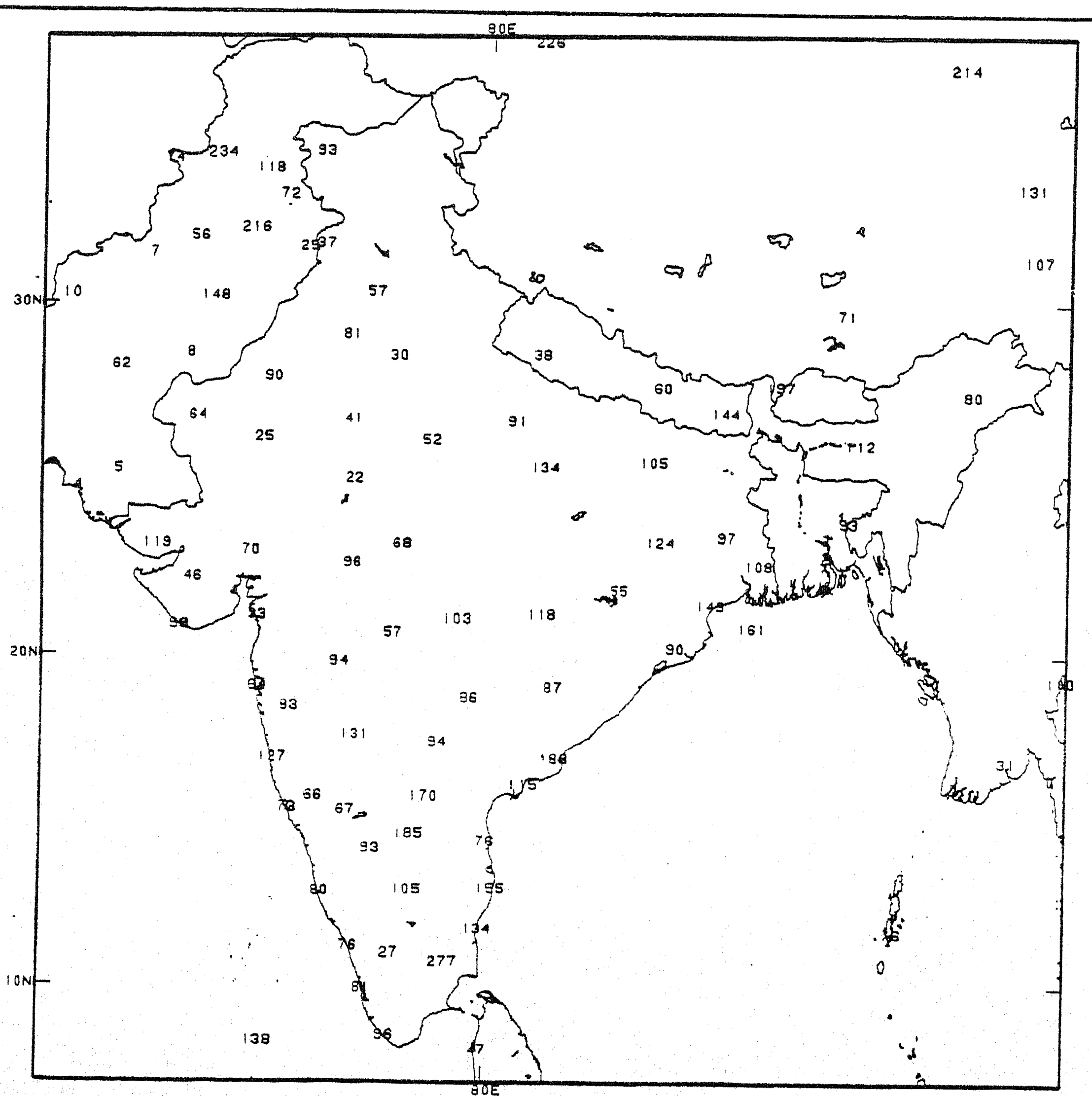


Figure 3. Percent of normal precipitation during June 1-July 15, 1989 (45 days). A station required 80% (36 days) or more of the days for inclusion. Most of southern and eastern India have recorded near to above normal rainfall since June 1 while northwestern India has received subnormal precipitation. In Bangladesh, incomplete data, satellite images, and press reports have indicated favorable moisture conditions.

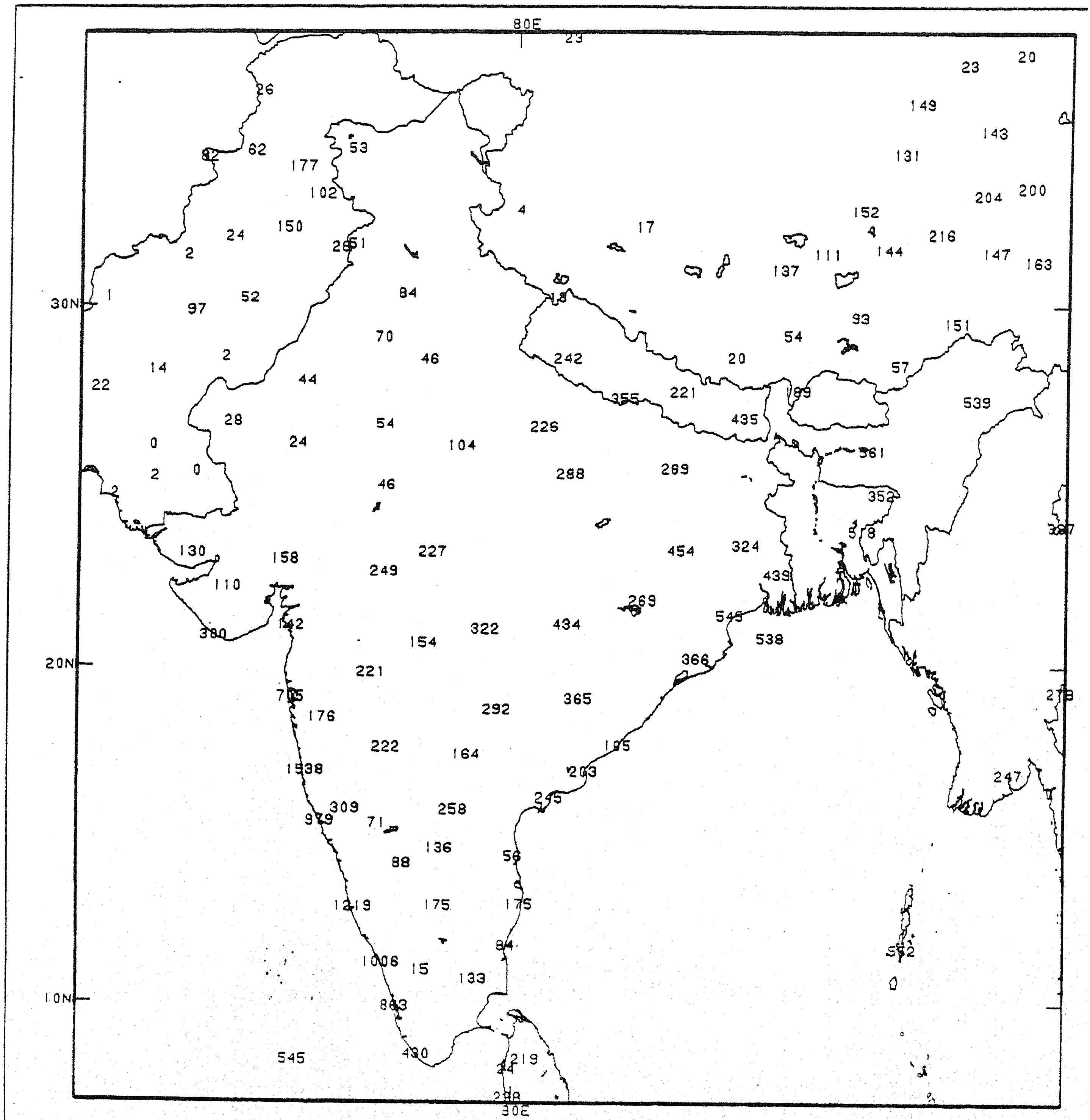


Figure 4. Total precipitation (mm) during June 1-July 15, 1989 (45 days). A station required 80% (36 days) or more of the days for inclusion. Greatest amounts, as expected, have occurred along India's western coast, in eastern India, and most likely throughout Bangladesh (incomplete station data).

SPECIAL CLIMATE SUMMARY

CLIMATE ANALYSIS CENTER, NMC
NATIONAL WEATHER SERVICE, NOAA

REVIEW ON THE AFRICAN SAHEL RAINY SEASON

Similar to the Indian monsoon season, the African Sahel rainy season usually occurs during June–September. The prevailing dry northerly winds of the winter and early spring months are gradually replaced by moist, southerly and easterly flow during the summer months in association with the northward movement of the Intertropical Convergence Zone (ITCZ) from the equatorial region. During June–September, most of the Sahel, from latitudes 8°N to 18°N, normally receive between 75% and 95% of their annual rainfall (see Figure 1). Precipitation rapidly decreases from south to north, and the greatest normal amounts during these four months are located along the western coast, in Nigeria and Cameroon, and the central Ethiopian highlands (see Figure 2).

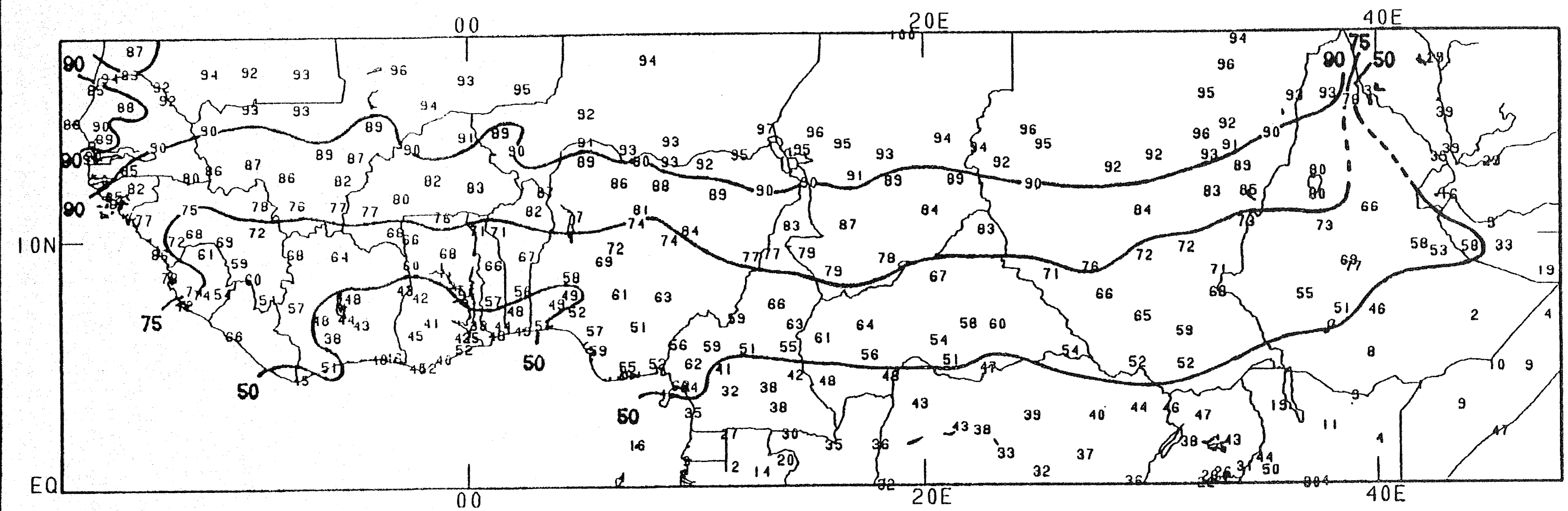


Figure 1. Percent of the normal annual precipitation (mm) during June–September. Contours are only drawn for 50, 75, and 90%. Much of the Sahel receives between 75% and 95% of their annual normal precipitation during June, July, August, and September in association with the northward advance of the Intertropical Convergence Zone (ITCZ).

For the first time in the past few decades, last year's rainy season was generally near normal. Subnormal precipitation and severe drought, a common occurrence across most of the Sahel during the past 20 or 30 years, was instead replaced with timely and generous rains at most locations. In some areas, such as Nigeria and Sudan, copious rainfall produced severe flooding. The situation in Sudan was exacerbated by downstream flooding from torrential downpours in the central Ethiopian highlands. In contrast, regions with below normal precipitation included southern Mauritania, central Mali, southern Cote d'Ivoire, and the northern sections of Togo and Benin.

Since June 1, 1989, many locations across the Sahel have generally reported near to above normal precipitation (see Figures 3 and 4). In contrast to last year, when portions of the western Sahel observed subnormal rainfall, most of Senegal, Gambia, southern Mauritania, and southern Mali have recorded more than twice the normal rainfall since June 1. Incomplete data, satellite images, and press reports have indicated near or above normal rainfall in Nigeria, the Central African Republic, Ethiopia, and in southern Chad and Sudan. On the other hand, areas with below normal rainfall included eastern Cote d'Ivoire and western Niger.

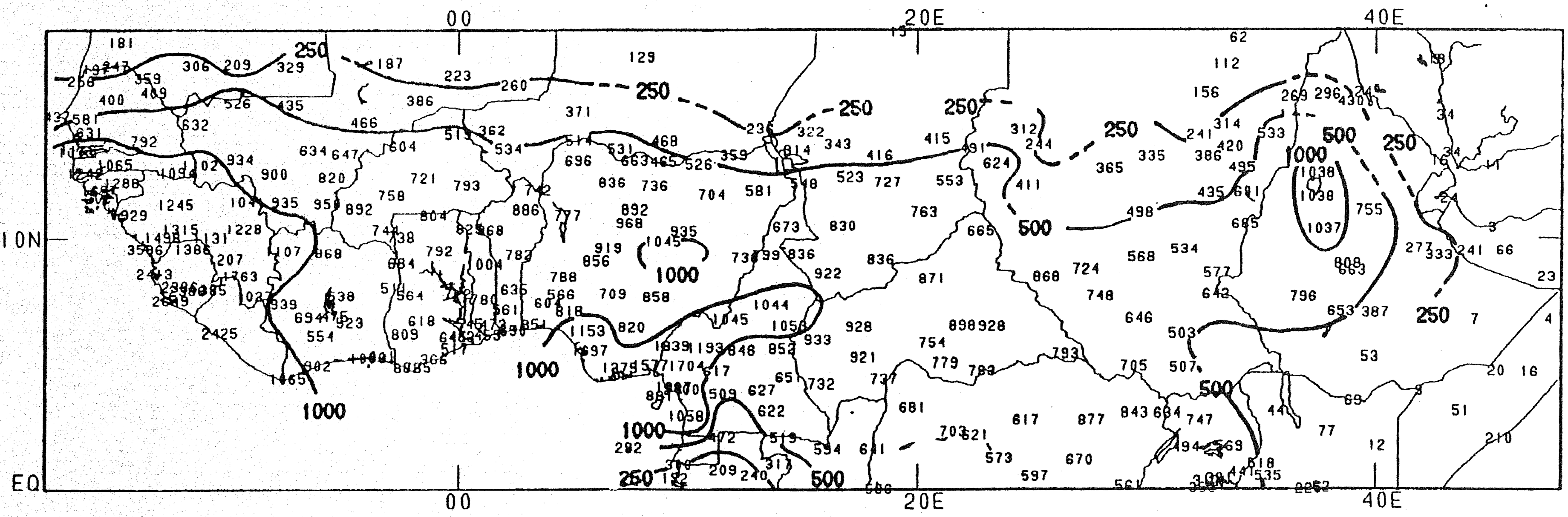


Figure 2. Total normal precipitation (mm) during June–September. Isohyets are only drawn for 250, 500, and 1000 mm. Totals during this four-month period rapidly increase from north to south, and the greatest amounts are found along the western coast, in Nigeria and Cameroon, and the central Ethiopian highlands.

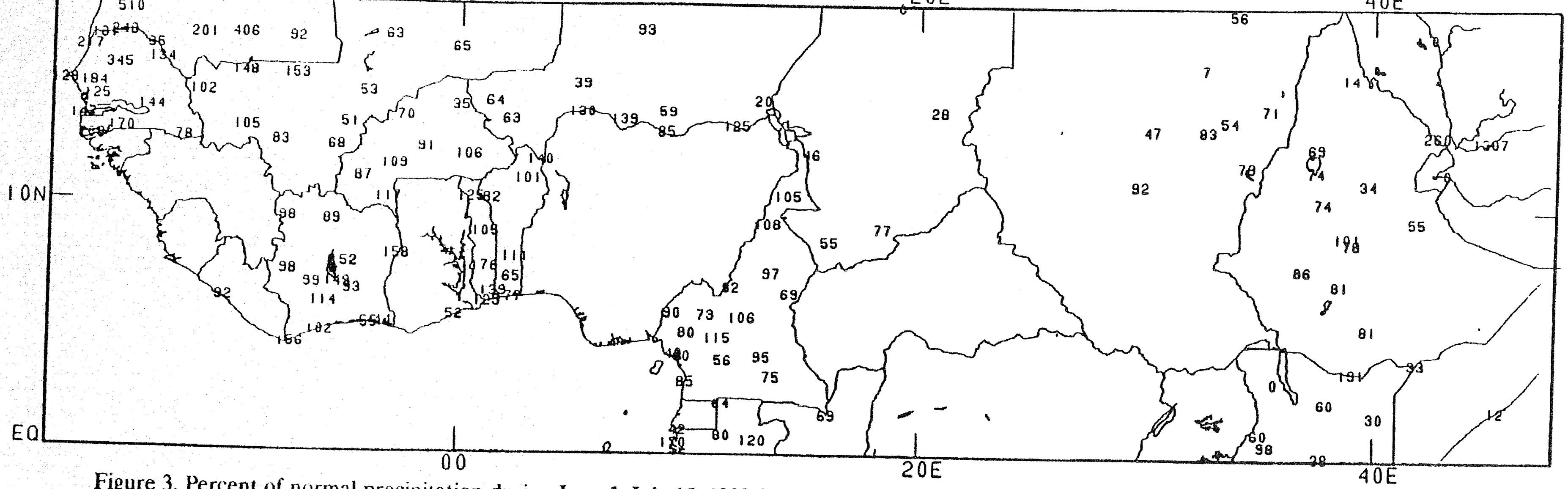


Figure 3. Percent of normal precipitation during June 1–July 15, 1989 (45 days). A station required 80% (36 days) or more of the days for inclusion. Since June 1, most of the Sahel has received near to above normal rainfall with the exception of eastern Cote d'Ivoire and southwestern Niger. Incomplete station data, satellite images, and press reports have indicated near normal conditions in Nigeria, Chad, Sudan, the Central African Republic, and Ethiopia.

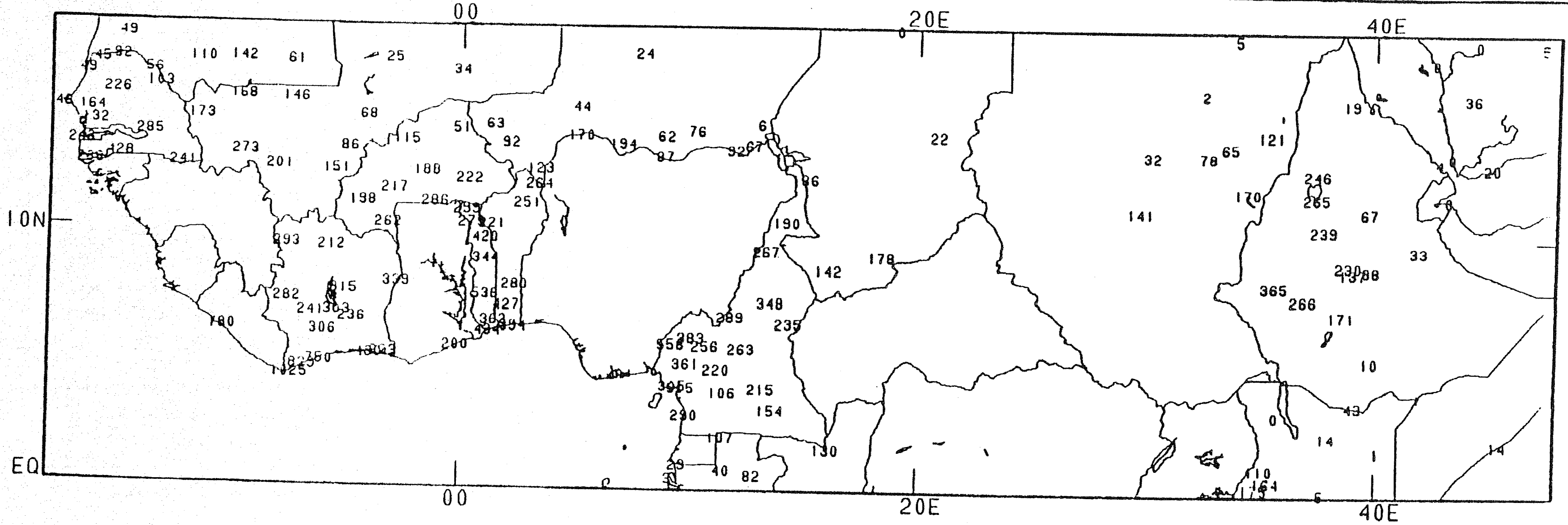
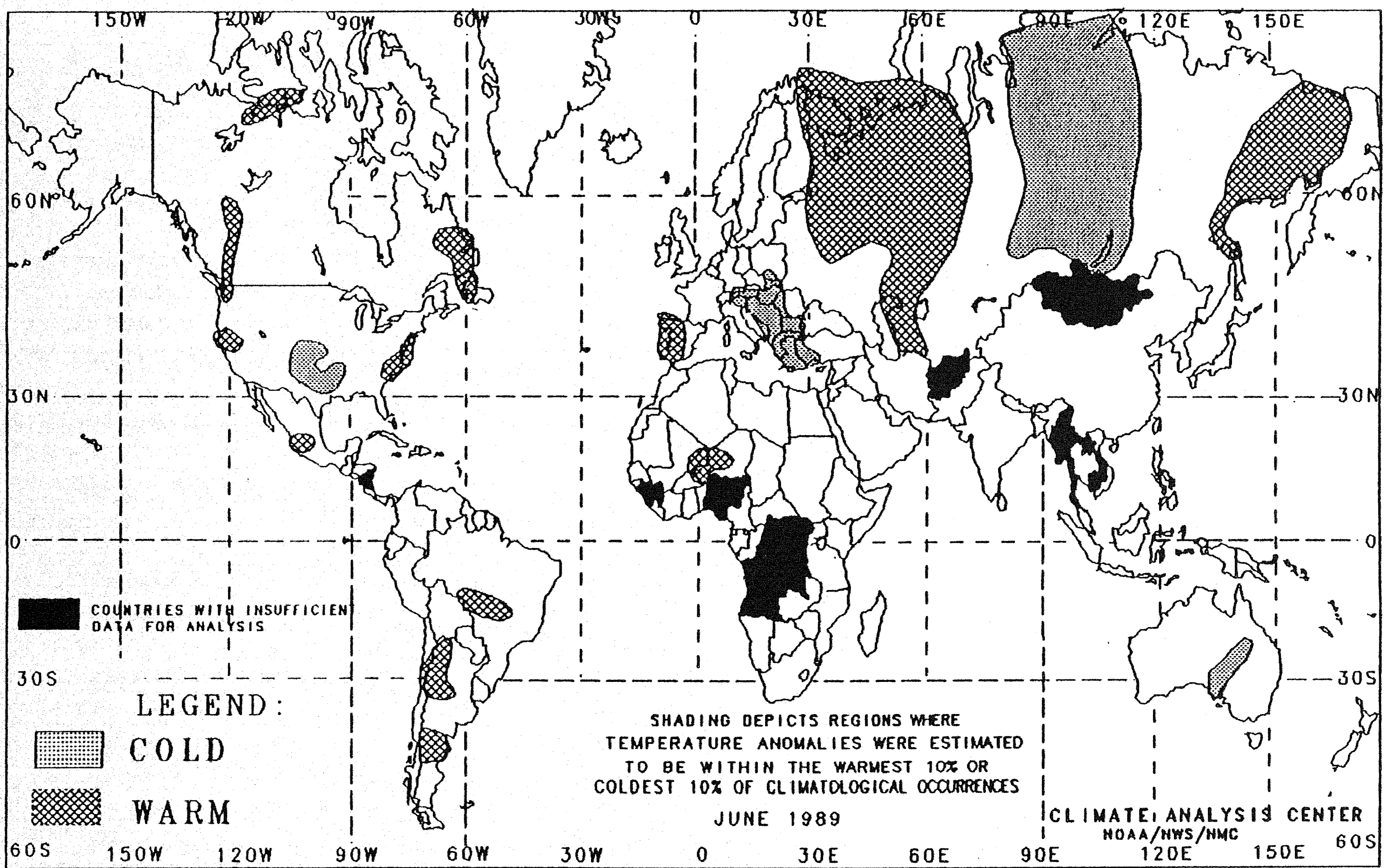


Figure 4. Total precipitation (mm) during June 1–July 15, 1989 (45 days). A station required 80% (36 days) or more of the days for inclusion.

GLOBAL TEMPERATURE ANOMALIES

1 MONTH



The anomalies on this chart are based on approximately 2500 observing stations for which at least 26 days of temperature observations were received from synoptic reports. Many stations do not operate on a twenty-four hour basis so many night time observations are not taken. As a result of these missing observations the estimated minimum temperature may have a warm bias. This in turn may have resulted in an overestimation of the extent of some warm anomalies.

Temperature anomalies are not depicted unless the magnitude of temperature departures from normal exceeds 1.5°C.

In some regions, insufficient data exist to determine the magnitude of anomalies. These regions are located in parts of tropical Africa, southwestern Asia, interior equatorial South America, and along the Arctic Coast. Either current data are too sparse or incomplete for analysis, or historical data are insufficient for determining percentiles, or both. No attempt has been made to estimate the magnitude of anomalies in such regions.

This chart shows general areas of one month temperature anomalies. Caution must be used in relating it to local conditions, especially in mountainous regions.

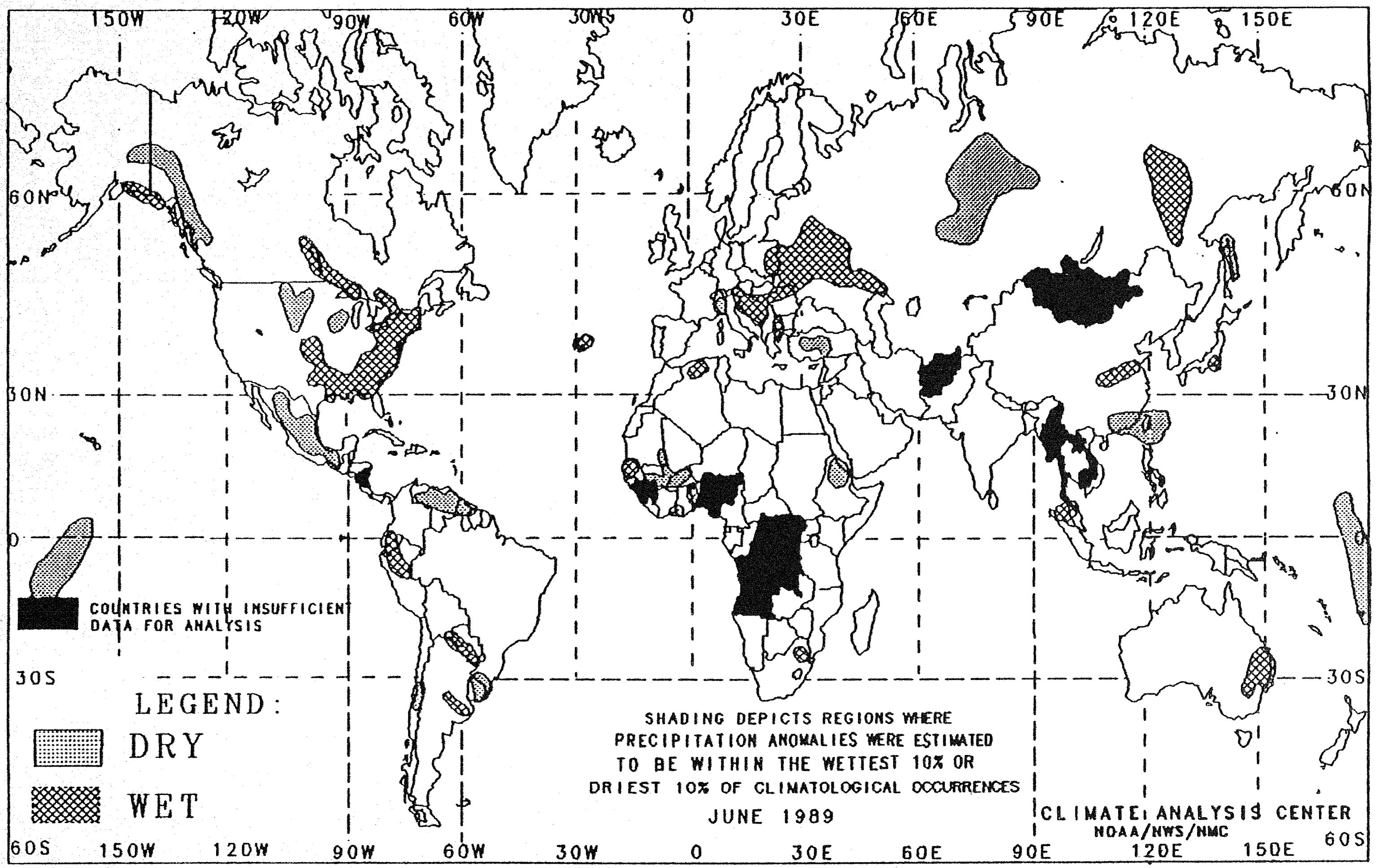
PRINCIPAL TEMPERATURE ANOMALIES

JUNE 1989

REGIONS AFFECTED	TEMPERATURE AVERAGE (°C)	DEPARTURE FROM NORMAL (°C)	COMMENTS
NORTH AMERICA			
North Central Canada	+5 to +7	+2 to +4	MILD – 5 weeks
Southwestern Canada and Northwestern United States	+14 to +19	Around +2	Very warm first half of June
Southeastern Canada	+11 to +14	+2 to +3	Very warm second half of June
Northern California and Western Nevada	+14 to +19	Around +2	Very warm first half of June
South Central United States	+19 to +26	–2 to –4	COOL – 2 to 5 weeks
Middle Atlantic States	+20 to +27	Around +2	Very warm first half of June
West Central Mexico	+22 to +24	Around +2	Very warm first half of June
SOUTH AMERICA AND EASTERN PACIFIC			
West Central Brazil	+22 to +26	+3 to +4	WARM – 8 weeks
Northern Argentina and Adjacent Chile	+10 to +15	+2 to +4	WARM – 8 to 9 weeks
Central Argentina	+4 to +8	+2 to +4	Very mild second half of June
EUROPE AND THE MIDDLE EAST			
Portugal and Western Spain	+17 to +26	+2 to +3	Very warm second half of June
South Central and Southeastern Europe	+13 to +24	–2 to –4	COOL – 2 to 7 weeks
Eastern European Soviet Union	+9 to +30	+2 to +7	WARM – 2 to 10 weeks
AFRICA			
Central Sahel Region	+32 to +37	Around +2	Very warm first half of June
ASIA			
Central Siberia	+1 to +16	–2 to –6	COLD – 5 to 6 weeks
Eastern Siberia	+10 to +17	+2 to +4	WARM – 5 to 6 weeks
AUSTRALIA AND WESTERN PACIFIC			
South Central Australia	+10 to +14	Around –2	COLD – 2 to 5 weeks

GLOBAL PRECIPITATION ANOMALIES

1 MONTH



The anomalies on this chart are based on approximately 2500 observing stations for which at least 27 days of precipitation observations (including zero amounts) were received or estimated from synoptic reports. As a result of both missing observations and the use of estimates from synoptic reports (which are conservative), a dry bias in the total precipitation amount may exist for some stations used in this analysis. This in turn may have resulted in an overestimation of the extent of some dry anomalies

In climatologically arid regions where normal precipitation for the one month period is less than 20 mm, dry anomalies are not depicted. Additionally, wet anomalies for such arid regions are not depicted unless the total one month precipitation exceeds 50 mm.

In some regions, insufficient data exist to determine the magnitude of anomalies. These regions are located in parts of tropical Africa, southwestern Asia, interior equatorial South America, and along the Arctic Coast. Either current data are too sparse or incomplete for analysis, or historical data are insufficient for determining percentiles, or both. No attempt has been made to estimate the magnitude of anomalies in such regions.

The chart shows general areas of one month precipitation anomalies. Caution must be used in relating it to local conditions, especially in mountainous regions.

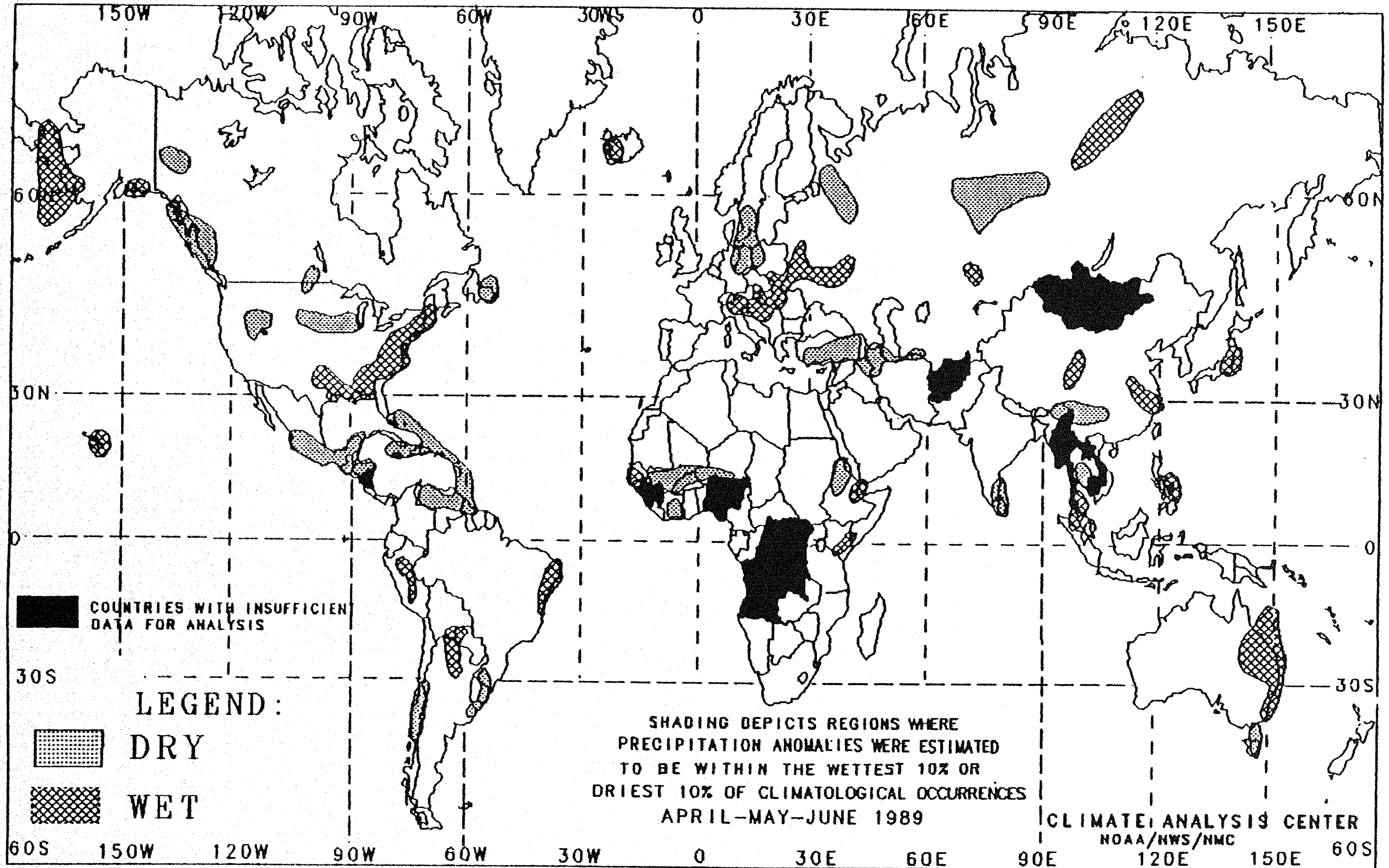
PRINCIPAL PRECIPITATION ANOMALIES

JUNE 1989

REGIONS AFFECTED	PRECIPITATION TOTAL (MM)	PERCENT OF NORMAL	COMMENTS
NORTH AMERICA			
Southeastern Alaska	148 to 311	196 to 254	Heavy precipitation early and late in June
Western Canada and East Central Alaska	0 to 38	0 to 53	DRY – 4 to 10 weeks
South Central Canada and Adjacent United States	124 to 167	142 to 198	WET – 2 to 4 weeks
North Central United States	18 to 38	13 to 45	DRY – 5 to 9 weeks
Eastern Iowa and Southwestern Wisconsin	34 to 61	33 to 64	DRY – 4 to 9 weeks
South Central and Eastern United States	105 to 455	137 to 495	WET – 5 to 10 weeks
Mexico	0 to 233	0 to 56	DRY – 8 to 14 weeks
SOUTH AMERICA AND EASTERN PACIFIC			
Cook Islands	3 to 70	5 to 39	DRY – 5 to 10 weeks
Venezuela, Guyana, and Suriname	15 to 172	17 to 62	DRY – 4 to 10 weeks
Ecuador and Peru	33 to 222	129 to 379	WET – 4 to 8 weeks
Border of Paraguay and Argentina	56 to 280	195 to 839	WET – 2 to 8 weeks
Central Chile	9 to 54	13 to 29	DRY – 12 to 16 weeks
Uruguay	6 to 31	5 to 36	DRY – 8 to 14 weeks
East Central Argentina	83 to 94	221 to 235	WET – 5 weeks
EUROPE AND THE MIDDLE EAST			
Azores	48 to 189	121 to 459	Heavy precipitation second half of June
Western Switzerland and Northwestern Italy	6 to 41	11 to 42	DRY – 4 to 14 weeks
Central and Eastern Europe	56 to 217	110 to 364	WET – 2 to 10 weeks
Greece and Bulgaria	71 to 86	172 to 289	Heavy precipitation second half of June
Turkey	3 to 5	8 to 18	DRY – 5 to 8 weeks
AFRICA			
North Central Algeria	40 to 53	262 to 342	WET – 5 weeks
Senegal and Gambia	77 to 332	184 to 452	WET – 2 to 10 weeks
Central Sahel Region	0 to 61	0 to 47	DRY – 4 to 5 weeks
Southeastern Ivory Coast	264 to 285	38 to 45	DRY – 14 weeks
Togo	257 to 339	173 to 184	Heavy precipitation first half of June
Northern Ethiopia	0 to 84	0 to 44	DRY – 5 weeks
Northeastern South Africa	9 to 63	467 to 994	WET – 10 weeks
ASIA			
Western Siberia	6 to 35	11 to 72	DRY – 8 to 10 weeks
Central Siberia	51 to 208	178 to 259	WET – 2 to 4 weeks
Sakhalin Island	3 to 11	7 to 15	DRY – 5 weeks
East Central China	205 to 335	206 to 367	Heavy precipitation first half of June
Central Japan	160 to 725	109 to 200	Heavy precipitation second half of June
Taiwan and Southeastern China	9 to 139	5 to 49	DRY – 5 to 7 weeks
AUSTRALIA AND WESTERN PACIFIC			
Malaysia and Sumatra, Indonesia	287 to 367	195 to 200	WET – 2 to 5 weeks
Eastern Australia	45 to 287	167 to 250	WET – 6 to 18 weeks
Fiji Islands and Kiribati Islands	6 to 204	8 to 77	DRY – 4 to 9 weeks

GLOBAL PRECIPITATION ANOMALIES

3 MONTH

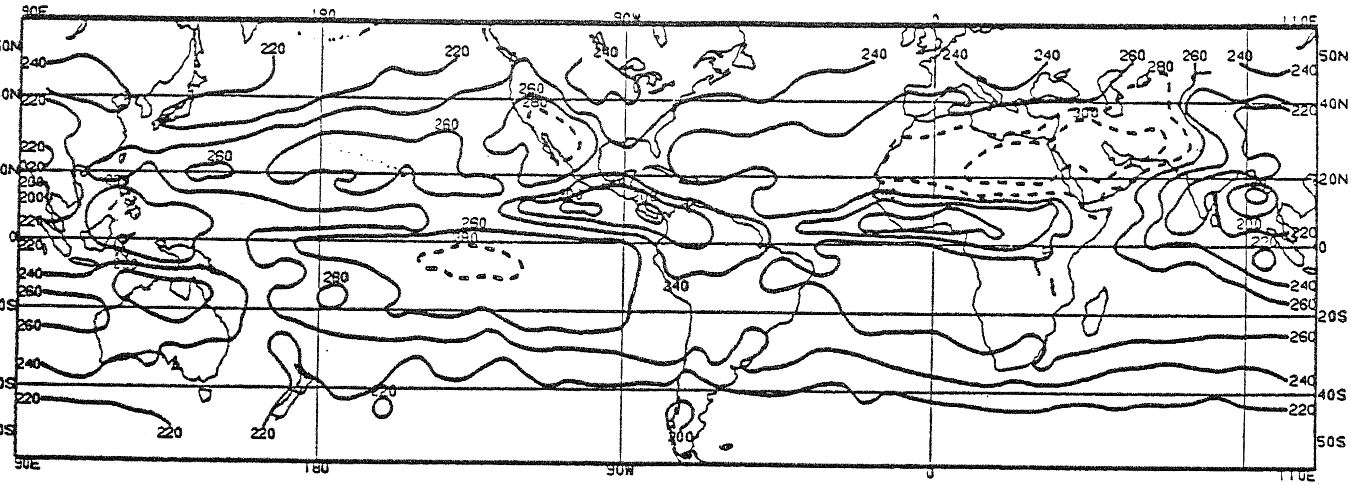


The anomalies on this chart are based on approximately 2500 observing stations for which at least 81 days of precipitation observations (including zero amounts) were received or estimated from synoptic reports. As a result of both missing observations and the use of estimates from synoptic reports (which are conservative), a dry bias in the total precipitation amount may exist for some stations used in this analysis. This in turn may have resulted in an overestimation of the extent of some dry anomalies

In climatologically arid regions where normal precipitation for the three month period is less than 50 mm, dry anomalies are not depicted. Additionally, wet anomalies for such arid regions are not depicted unless the total three month precipitation exceeds 125 mm.

In some regions, insufficient data exist to determine the magnitude of anomalies. These regions are located in parts of tropical Africa, southwestern Asia, interior equatorial South America, and along the Arctic Coast. Either current data are too sparse or incomplete for analysis, or historical data are insufficient for determining percentiles, or both. No attempt has been made to estimate the magnitude of anomalies in such regions.

The chart shows general areas of three month precipitation anomalies. Caution must be used in relating it to local conditions, especially in mountainous regions.

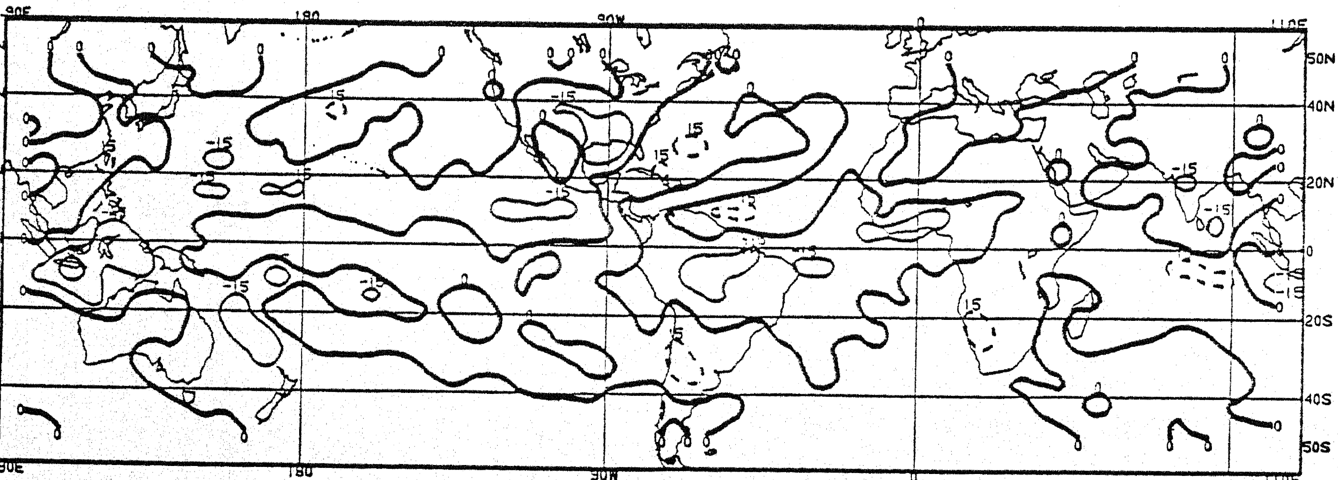


Monthly Mean Outgoing Long Wave Radiation (OLR) for June 1989

EXPLANATION

The mean monthly outgoing long wave radiation (OLR) as measured by the NOAA-9 AVHRR IR window channel by NESDIS/SRL p). Data are accumulated and averaged over 2.5° areas to a 5° Mercator grid for display. Contour intervals are 20 Wm^{-2}, and contours 280 Wm^{-2} and above are dashed. In tropical areas (for our purposes 20°N - 20°S) that receive primarily convective rainfall, a mean OLR lue of less than 200 Wm^{-2} is associated with significant monthly precipitation, whereas a value greater than 260 Wm^{-2} normally indicates le or no precipitation. Care must be used in interpreting this chart at higher latitudes, where much of the precipitation is non-convective, in some tropical coastal or island locations, where precipitation is primarily orographically induced. The approximate relationship tween mean OLR and precipitation amount does not necessarily hold in such locations.

The mean monthly outgoing long wave radiation anomalies (bottom) are computed as departures from the 1974 - 1983 base period an (1978 missing). Contour intervals are 15 Wm^{-2}, while positive anomalies (greater than normal OLR, suggesting less than normal cloud ver and/or precipitation) are dashed and negative anomalies (less than normal OLR, suggesting greater than normal cloud cover and/or ecipitation) are solid.



Monthly Mean Outgoing Long Wave Radiation (OLR) Anomaly for June 1989